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COMPANY
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INTER-OFFICE CORRESPONDENCE / SUBJECT: Ekofisk 2/4-5X, Norwegian Sector North Sea
BARTLESVILLE, OKLAHOMA Er-112-71

14 JUN1971

June 9, 1971

Mr. R. E. Beck
Phillips Petroleum Company
London, England

Attention: C. L. Wyndham

In accord with Mr. C. L. Wyndham's request of May 6, 1971, we are immediately transmitting the preliminary conclusions that have been obtained from a geochemical study that is in progress on the 2/4-5X well so that you may have the benefit of these data to aid in evaluating open acreage in the northern portion of the United Kingdom sector of the North Sea. We understand there may be an opportunity to obtain exploration licenses in this area in mid-June of this year. This particular study involves 21 sidewall cores that were characterized for source rock properties and 9 crude oil samples that were geochemically characterized and correlated with other samples from the North Sea Tertiary Basin area.

The sidewall cores are from the 9385-10093 foot interval and were taken in the Paleocene and Eocene stratigraphic section with the top of the Paleocene reported to be at 9697 feet. These cores were transmitted under L. Dale's cover letter LD/GJ-027 dated October 5, and were received October 13, 1970. The 9 companion gas-oil samples from drill stem tests 2, 4 and 5 which tested the 10,810-860 and 10,730-780; 10,480-550; and the 10,250-340 foot intervals respectively were transmitted under L. Dale's cover letter LD/KL SL-002 dated January 8 and were received January 29, 1971.

The conclusions from this study are based on data generated to date and a final interpretation will be made after all samples have been analyzed. The basic geochemical concepts and principles on which the conclusions and interpretations are based were presented in letters Er-132-69 and Er-239-69 concerning the Cod and Ekofisk fields, respectively. Geochemical comparisons also are made with data obtained from the study of the 2/4-4AX and 30/13-1X samples which were presented in letters Er-103-71 and Er-107-71.

Our present conclusions and comments obtained from a study of these two groups of samples are:

1. Sidewall cores from the 9385-10093 foot interval in the 2/4-5X well.

   a. The Paleocene-Eocene interval that was cored is represented primarily by silty, arenaceous, slightly calcareous, micaceous, greenish-gray to dark-gray to brownish-gray laminated and fractured shales. The laminated character is the result of closely spaced paper-thin light colored siltstone laminae which contain glauconite, chlorite,

euhedral pyrite grains, and finely-divided manganese minerals. The interbedded friable siltstone layers are argillaceous and arenaceous and weakly cemented with calcite. Organic matter is dispersed throughout the shales and siltstones as discrete blebs and as finely-divided material. Microfossils are not common and generally poorly preserved. The siltstone laminae and layers commonly contain fine-grained muscovite oriented parallel to the bedding planes.

b. All except the 9550, 9595, 9620, 9686, 9718, and 9990 foot samples contain sufficient organic matter to meet the basic requirement of a source rock, that is, a rock in which petroleum has been generated in significant quantities and which has migrated from the rock. Not all the oil present in these samples is indigenous to the section sampled, for the relatively high ratio of oil to kerobitumen indicates that oil is migrating within these shales. Probably the oil is migrating along the porous siltstone laminae and other such permeability channels in response to the hydrodynamic pressure gradients in the area. The geochemical character of the oils suggests that the distance of oil migration is not great. The fact that oil is migrating within these shales and that some of the more permeable thin siltstone layers are serving as reservoirs suggests that interbedded Paleocene sandstones or tongues having good reservoir characteristics would be good exploration targets in this region.

c. With the exception of the 9750 foot sample, the organic matter in these cores was deposited in an open sea environment under rather uniform conditions. The organic matter in the 9750 foot sample accumulated in a marine environment that bordered on the brackish realm.

d. The oil in these Paleocene-Eocene age shales is geochemically similar and apparently the organic matter from which the oil stems accumulated under rather uniform ecological conditions. The odd-even predominance (OEP) curves for the 2/4-5X cores closely resembles the OEP curves for oils of marine origin detected in the suite of cores from the 30/13-1X and 2/4-4AX wells. The 2/4-5X samples also have OEP curves similar to the cores from the 9450-9845 foot interval in the 2/4-2X well. This finding suggests that during the time of accumulation of organic matter in these particular samples ecological and environmental factors were quite uniform.

2. Companion gas-oil samples from drill stem tests 2, 4 and 5 which tested the 10,810-860 and 10,730-780; 10,480-10,550; and the 10,250-340 foot intervals respectively in the 2/4-5X.

a. The gases are of high quality and very similar in composition. Methane ranges from 82-85 mole per cent, carbon dioxide does not exceed 2.2 mole per cent, and the nitrogen content is low.

b. The crude oils are quite uniform in composition and physical properties and are high in saturates and low in asphaltic content. The composition of this suite of crude oils is quite similar to the crudes obtained from the 2/4-4AX well.

c. Geochemically, the oils are considered to have originated in a source rock facies of common origin, and slight variations in physical and chemical properties probably are the result of migration and post-accumulation conditions.

d. Geochemical comparison of the crude oil from the 2/4-5X with crude oils from the 2/4-1AX, 2/4-2X, 2/4-4AX, and 30/13-1X wells indicates all are quite similar and apparently stem from a source rock facies of comparable age that was deposited under similar conditions. The source rock from which these oils originated is predominantly of marine origin and petroleum genesis is well advanced, that is, the rock is geochemically mature.

e. On the basis of data generated to date, it appears that the oil in carbonate reservoirs of Danian age in the Ekofisk and West Ekofisk areas and the oil in early Mesozoic sandstone reservoirs in the Josephine area originated within Paleocene source rock facies. Geochemical evidence indicates that downward migration of oil into the stratigraphically older reservoirs did not occur uniformly through the section but was concentrated along permeability channels.

The data upon which these conclusions and comments are based are presented in Attachment I, Tables I through XI, and Figures 1 through 5. Attachment I contains a lithologic description of the sidewall cores, and in Table I are presented the source rock compositional data for the organic matter present in the shales. The geochemical properties of the crude oil obtained from drill stem tests 2, 4 and 5 are listed in Table II. The chemical composition of the 9 companion gas-oil samples along with the computed composite stream for each sample are provided by the computer printed sheets in Tables III through XI. These computed values are significant to only two decimal places rather than three as printed on the computer print-out sheets, so the last digit of each value should be truncated and the next number rounded off. In the figures are presented odd-even predominance and n-paraffin (alkane) distribution curves for sidewall cores and crude oil samples from the 2/4-5X well and other samples from the North Sea Tertiary Basin for comparison.

J. Gordon Erdman

JGE/DAM:gml

Attachment: Attachment I
Tables I-XI
Figures 1-5

Attachment I

Lithologic Description[1] of Sidewall Cores From the 2/4-5X Well, Norwegian Sector, North Sea

Geochemistry Branch Code

HAV — Depth 9385 feet. Shale, dark greenish gray (5GY 4/1) very silty, coherent, porous and intensely sheared and slickensided; appreciable pyrite as masses and dissemination, locally shale contains chlorite.

HAW — Depth 9416 feet. Shale, very light gray (N 8) silty, coherent, well developed parallel lamination with alternating light and dark laminae, darker laminae accentuated by concentrations of finely-divided black organic matter; black specks of organic matter dispersed throughout specimen; some pyrite with irridescent surfaces common; minor mica; weakly calcareous, contains microfossils.

HAX — Depth 9440 feet. Shale, greenish gray (5GY 6/1) silty, coherent, micaceous, well developed irregular lamination, highly fractured and slickensided, pyrite as euhedral crystals and crystal aggregates common throughout, finely-divided black organic matter and muscovite dispersed throughout.

HAY — Depth 9470 feet. Shale, olive gray (5Y 4/1) coherent, soft, well developed lamination, highly fractured with some striations, mottled darker gray locally, smooth broken surfaces.

HAZ — Depth 9510 feet, Shale, medium gray (N 5) silty, coherent, micaceous, highly sheared and slickensided; some pyrite as minute disseminated euhedral crystals and masses.

HBA — Depth 9550 feet. Shale, light gray (N 7) silty, coherent, highly sheared and slickensided, minute euhedral pyrite crystals and masses disseminated throughout, minor mica, sub-conchoidal fracture, some black finely-divided organic matter dispersed throughout.

HBB — Depth 9595 feet. Shale, light gray (N 7) silty, coherent; same as HBA except slightly harder, less deformed, and faintly laminated; pyrite less abundant but still conspicuous.

HBC — Depth 9620 feet. Shale, medium light gray (N 6) otherwise same as HBA except for local brownish mottling, less deformation, traces of glauconite, faintly laminated; locally shale appears to be altered to chlorite.

HBD — Depth 9657 feet. Shale, olive gray (5Y 4/1) silty, coherent, flakey, micaceous, sheared and slickensided, highly mottled, faintly laminated, matrix stained brownish-black, local accumulations of black organic matter and oxidized or dead oil; unstained areas are light gray (N 7) or greenish gray (5GY 6/1).

(1) Color designations according to Geological Society of America Color Chart.

HBE Depth 9686 feet. Shale, brownish gray (5YR 4/1) silty, coherent, hard, appears to be oxidized, intensely fractured and slickensided; contains intermixed medium to fine-grained argillaceous siltstone in minor amounts.

HBF Depth 9718 feet. Shale, dark gray (N 3) very silty and arenaceous, coherent, hard, moderately to well developed parallel lamination with some white or lighter gray streaks along laminae; black sooty surfaces common and probably represent very fine-grained pyrolusite or manganite; pyrite very abundant as minute crystals and encrustations along laminae and dispersed in sample, giving rise to distinctive irridescent surfaces.

HBG Depth 9725 feet. Shale, light gray (N 7) silty, coherent, micaceous, brecciated, with minute disseminated grains of euhedral pyrite common.

HBH Depth 9750 feet. Shale, dark gray (N 3) silty, calcareous, coherent, fractured, well developed parallel siltstone lamination, pyrite very abundant as minute disseminated euhedral crystals, aggregates, and encrustations, giving rise to irridescent surfaces on laminae; black finely divided pyrolusite or manganite common along laminae; some lighter stringers or streaks occur along laminae; essentially same as HBF.

HBJ Depth 9858 feet. Sample was crushed before it was described lithologically.

HBK Depth 9880 feet. Shale, medium gray (N 5) silty, coherent, micaceous, faintly irregularly laminated, fine-grained flakes of muscovite well oriented in plane of lamination, black specks and flakes of finely-divided organic matter common, traces of subrounded and rounded grains of glauconite or chlorite, poorly expressed system of conjugate fractures; very silty interlaminations common.

HBL Depth 9905 feet. Shale, medium dark gray (N 4) very silty, micaceous, coherent, highly brecciated, subrounded glauconite or chlorite; finely-divided black organic matter disseminated throughout.

HBM Depth 9935 feet. Shale, medium dark gray (N 4) silty, micaceous, coherent, soft, irregularly laminated, brecciated, traces of glauconite or chlorite and finely-divided pyrite, some black macerated organic matter dispersed throughout.

HBN Depth 9965 feet. Siltstone, light olive gray (5Y 6/1) medium-grained, poorly sorted, very calcareous, micaceous, argillaceous, trace of glauconite or chlorite, sucrosic texture, coherent, irregular fracture; blebs and blakes of black organic matter.

HBO Depth 9990 feet. Shale, same as HBE.

HBP Depth 10,050 feet. Dolomite, light gray (N 7) argillaceous, fine-grained matrix with polygonal network inside of which dolospar occurs either as resrystallization of matrix filling polygons or infilling as cement; irregular fracture; polygonal structure probably represents recrystallized coral material.

HBQ Depth 10,093 feet. Shale, same as HBE, but calcareous.

TABLE I

Source Rock Evaluation of Sidewall Cores from the 2/4-5X Well, Norwegian Sector, North Sea

Geochem. Branch Code	Core Depth, feet	Lithology	Carbonate Carbon, wt %	Organic Carbon, wt %	Ratio Soluble/ Total Carbon	Soluble Organic Matter								Odd-Even Predominance, OEP	Inferred Depositional Environment of Soluble Organic Matter
						Total		Saturates		Aromatics		Asphaltics			
						Wt %	δC^{13}_{PDB}	Wt %	δC^{13}_{PDB}	Wt %	δC^{13}_{PDB}	Wt %	δC^{13}_{PDB}		
HAV	9385	Shale	0.59	0.71	0.243	0.215	-27.1	79.2	-27.2	13.1	-27.2	7.7	-26.4	0.77(2)	Marine
HAW	9416	"	0.16	0.64	0.018	0.014	-	-	-	-	-	-	-	-	?
HAX	9440	"	0.11	0.66	0.090	0.075	-	52.3	-28.3	33.9	-26.7	13.8	-26.2	1.13	Marine
HAY	9470	"	0.33	0.85	0.101	0.107	-	55.4	-	32.3	-25.9	12.3	-25.9	1.35	Marine
HAZ	9510	"	0.12	0.56	0.109	0.076	-27.6	58.6	-27.7	29.1	-26.6	12.3	-26.2	1.14	Marine
HBA	9550	"	0.08	0.20	0.116	0.029	-27.0	-	-	-	-	-	-	-	Marine
HBB	9595	"	0.06	0.13	0.094	0.015	-27.3	-	-	-	-	-	-	-	Marine
HBC	9620	"	0.04	0.26	0.080	0.026	-27.0	-	-	-	-	-	-	-	Marine
HBD	9657	"	0.06	3.40	0.050	0.212	-27.3	32.5	-28.3	50.4	-26.6	17.1	-26.1	1.35	Marine
HBE	9686	"	0.29	0.18	0.074	0.017	-27.4	-	-	-	-	-	-	-	Marine
HBF	9718	"	0.11	0.30	0.853	0.320	-27.9	69.7	-	24.8	-27.0	5.5	-26.8	1.00	Marine
HBG	9725	"	0.11	0.77	0.369	0.355	-27.7	77.4	-	18.1	-27.1	4.5	-27.1	0.99	Marine
HBH	9750	"	0.06	2.17	0.107	0.291	-28.3	49.6	-29.0	39.6	-27.3	10.8	-27.4	1.01	Marine to brackish
HBJ	9858	—(1)	1.49	0.92	0.334	0.384	-26.8	75.6	-	18.9	-	5.5	-25.6	1.03	Marine
HBK	9880	"	0.08	1.03	0.050	0.064	-26.8	53.8	-	36.2	-26.0	10.0	-25.5	1.61	Marine
HBL	9905	"	0.89	0.86	0.059	0.063	-27.0	47.0	-28.2	38.9	-26.1	14.0	-25.7	1.54	Marine
HBM	9935	"	0.23	0.93	0.081	0.095	-27.1	56.9	-28.0	33.2	-26.2	9.9	-25.7	1.17	Marine
HBN	9965	Siltstone	2.38	0.82	0.207	0.212	-27.5	67.8	-27.9	26.1	-27.8	6.1	-26.2	1.04	Marine
HBO	9990	Shale	0.27	0.19	0.122	0.029	-	-	-	-	-	-	-	-	?
HBP	10050	Dolomite	3.43	0.66	0.089	0.073	-26.9	-	-	-	-	-	-	-	Marine
HBQ	10093	Shale	2.08	0.57	0.602	0.429	-27.0	75.0	-27.2	16.7	-28.4	8.3	-26.0	1.29	Marine

(1) Sample was processed geochemically before it was described.

(2) Value is approximate.

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TABLE II

Geochemical Characterization of Crude Oil From the 2/4-5X Well, Norwegian Sector, North Sea

Geochem. Branch Code	Drill Stem Test No.	Drill Stem Test Flow	Perforated Interval, feet	API Gravity	Sulfur, wt %	Nitrogen, wt %	Trace Metals Vanadium, ppm	Trace Metals Nickel, ppm	Total Crude δC^{13}_{PDB}	Petroleum Fractions Saturates Wt %	Saturates δC^{13}_{PDB}	Aromatics Wt %	Aromatics δC^{13}_{PDB}	Asphaltics Wt %	Asphaltics δC^{13}_{PDB}	Odd-Even Predominance, OEP
HGM	2	1	10,810-860 & 10,730-780	44.2	0.05	0.04	0.09	0.10	-28.4	83.2	-28.4	16.1	-27.5	0.7	-27.5	1.01
HGO	2	2	"	44.6	0.05	0.04	0.09	0.10	-28.2	82.8	-28.4	16.8	-27.7	0.4	-27.2	1.00
HGQ	2	3	"	42.9	0.06	0.04	0.09	0.10	-28.3	83.1	-28.4	15.9	-27.7	1.0	-26.7	1.03
HGS	4	1	10,480-550	43.1	0.07	0.04	0.09	0.20	-28.3	78.7	-28.2	20.0	-27.5	1.3	-27.4	1.03
HGU	4	2	"	43.8	0.06	0.04	0.09	0.02	-28.3	83.2	-28.3	15.6	-27.4	1.2	-26.4	1.02
HGW	4	3	"	43.8	0.07	0.04	0.09	0.20	-28.2	82.9	-28.3	16.2	-27.5	0.9	-27.0	1.04
HGY	5	1	10,250-340	47.9	0.04	0.04	0.09	0.10	-28.2	86.5	-28.3	12.7	-27.6	0.8	-27.0	1.01
HHA	5	2	"	47.9	0.04	0.04	0.09	0.10	-28.3	84.5	-28.3	15.0	-27.6	0.5	-26.9	1.02
HHC	5	3	"	45.7	0.04	0.04	0.09	0.10	-28.4	85.8	-28.3	13.7	-27.6	0.5	-26.9	1.00

TABLE III

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGL = GAS SAMPLE AHGM = LIQUID SAMPLE

DST No. 2, Flow 1, 10,810-860 & 10,730-780 feet, 2/4-5X well

	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
COMPONENT	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.377	.540			.298	.176
CARBON DIOXIDE	1.701	3.830			1.344	1.249
HYDROGEN SULFIDE						
METHANE	84.636	69.470			66.897	22.646
ETHANE	8.307	12.780	.100	.020	6.587	4.179
PROPANE	3.041	6.860	1.580	.457	2.734	2.544
ISOBUTANE	.451	1.340	1.147	.437	.597	.732
N-BUTANE	.800	2.380	4.382	1.671	1.551	1.902
ISOPENTANE	.209	.770	3.115	1.474	.818	1.245
N-PENTANE	.219	.810	4.423	2.094	1.100	1.675
NEOHEXANE	.004	.017	.209	.118	.047	.085
CYCLOPENTANE	.009	.031	.342	.157	.079	.116
2,3-DIMETHYLBUTANE	.005	.024	.269	.152	17,887.061	.111
2-METHYLPENTANE	.036	.157	1.834	1.037	C7+ = 19,529.413	.750
3-METHYLPENTANE	.019	.085	1.165	.659	.259	.472
N-HEXANE	.054	.240	3.642	2.059	.806	1.466
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.014	.059	1.148	.634	.252	.4[illegible]
2,4-DIMETHYLPENTANE	.002	.010	.157	.103	.034	.073
BENZENE	.011	.044	.882	.452	.194	.319
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.012	.053	1.415	.781	.306	.544
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.008	.042	.994	.654	.215	.454
2,3-DIMETHYLPENTANE	.003	.015	.374	.246	.081	.171
3-METHYLHEXANE	.008	.040	1.032	.678	.222	.470
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.002	.009	.191	.123	.041	.086
1-TRANS-3-DMCP	.001	.007	.244	.157	.052	.108
1-TRANS-2-DMCP	.002	.012	.305	.197	.066	.136
3-ETHYLPENTANE						

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Table III (Continued)

N-HEPTANE	.018	.093	3.057	2.010	.655	1.385
2,2-DIMETHYLHEXANE			2.203	1.651	.462	1.113
1-CIS-2-DMCP	.001	.003	.107	.069	.023	.047
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.012	.061			.010	.020
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.000	.003	.125	.093	.027	.064
2,4-DIMETHYLHEXANE	.001	.006	.249	.187	.053	.128
2,2,3-TRIMETHYLPENTANE			.020	.015	.004	.010
1-TRANS-2-CIS-4-TMCP	.000	.003	.093	.069	.020	.047
TOLUENE	.009	.041			.007	.013
3,3-DIMETHYLHEXANE			1.882	1.411	.394	.951
1-TRANS-2-CIS-3-TMCP			.067	.049	.014	.033
2,3-DIMETHYLHEXANE	.000	.002	.138	.103	.029	.070
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.859	.644	.180	.43
4-METHYLHEPTANE	.003	.018			.002	.006
3,4-DIMETHYLHEXANE	.001	.006	.269	.202	.057	.138
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.046	.034	.010	.023
3-METHYLHEPTANE	.003	.015	.774	.580	.164	.396
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.020	.015	.004	.010
2,2,5-TRMETHYLHEXANE			.023	.020	.005	.013
1,1-DIMETHYLCYCLOHEXANE	.003	.017			.002	.005
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.614	.452	.129	.305
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.000	.001			.000	.000
1-ME-3-ETHYLCYCLOPENTANE	.000	.001	.174	.128	.036	.086
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.006	.035	2.702	2.025	.571	1.376
2,4,4-TRIMETHYLHEXANE	.000	.001	.035	.029	.007	.02
2,3,3-TRIMETHYLHEXANE	.000	.001	.047	.039	.010	.02
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE	.000	.001			.000	.000
---UNIDENTIFIED---			.105	.088	.022	.060
2,4-DIMETHYLHEPTANE	.000	.003	.199	.167	.042	.113
3,5-DIMETHYLHEPTANE			.280	.236	.059	.159
2,5-DIMETHYLHEPTANE	.001	.003			.000	.001
ETHYLCYCLOHEXANE	.001	.007	.527	.388	.111	.264
ETHYLBENZENE	.000	.001	.205	.143	.043	.096

TABLE III (concluded)

1-CIS-3-CIS-5-TMCH	.000	.002			.000	.000
---UNIDENTIFIED---			.188	.157	.039	.106
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.023	.020	.005	.013
PARA-XYLENE	.001	.003	.381	.265	.080	.180
META-XYLENE	.002	.013	1.524	1.062	.321	.720
2,3-DIMETHYLHEPTANE	.000	.001	.123	.103	.026	.070
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.001	.004	.432	.364	.091	.247
2-METHYLOCTANE	.001	.004	.374	.315	.079	.213
3-ETHYLHEPTANE			.070	.059	.015	.040
3-METHYLOCTANE	.001	.004	.403	.339	.085	.23[illegible]
ORTHO-XYLENE	.001	.003	.557	.388	.117	.263
2,2,4-TRIMETHYLHEPTANE	.000	.001	.021	.020	.005	.014
2,2,5-TRIMETHYLHEPTANE			.026	.025	.006	.017
2,2,6-TRIMETHYLHEPTANE			.053	.049	.011	.033
2,5,5-TRIMETHYLHEPTANE			.032	.029	.007	.020
2,4,4-TRIMETHYLHEPTANE			.016	.015	.003	.010
ISOPRCPYLBENZENE			.093	.074	.020	.050
N-NCNANE	.002	.013	1.892	1.592	.398	1.078
N-PRCPYLBENZENE			.044	.034	.009	.023
1-METHYL-3-ETHYLBENZENE			.243	.192	.051	.129
1-METHYL-4-ETHYLBENZENE			.131	.103	.027	.070
1-METHYL-2-ETHYLBENZENE			.118	.093	.025	.063
1,3,5-TRIMETHYLBENZENE			.548	.433	.115	.292
1,2,4-TRIMETHYLBENZENE			.499	.393	.105	.265
1,2,3-TRIMETHYLBENZENE			.162	.128	.034	.086
N-DECANE	.001	.005	1.511	1.411	.317	.952
C-9 NAPTHENES			.172	.143	.036	.096
C-10 PARAFFINS +NAPHTHS.			1.787	1.656	.374	1.1[illegible]
C-10 BENZENES						
UNDECANES			3.105	3.185	.651	2.147
N-UNDECANE			1.452	1.489	.304	1.004
DODECANES			1.935	2.163	.406	1.458
N-DODECANE			1.249	1.396	.262	.941
TRIDECANES			1.458	1.764	.306	1.189
N-TRIDECANE			1.036	1.253	.217	.845
TETRADECANES			.800	1.042	.168	.702
N-TETRADECANE			.578	.752	.121	.507
PENTADECANES			.363	.506	.076	.341
N-PENTADECANE			.190	.265	.040	.179
HEXADECANES AND HEAVIER	.000	.006	32.644	51.515	6.842	34.724

TABLE IV

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGN = GAS SAMPLE AHGO = LIQUID SAMPLE

DST No. 2, Flow 2, 10,810-860 & 10,730-780 Feet, 2/4-5X Well

COMPONENT	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.368	.520			.310	.214
CARBON DIOXIDE	1.686	3.740			1.419	1.539
HYDROGEN SULFIDE						
METHANE	83.939	67.871			70.658	27.937
ETHANE	8.400	12.730	.145	.029	7.094	5.257
PROPANE	3.231	7.180	1.664	.486	2.983	3.242
ISOBUTANE	.492	1.440	1.112	.428	.590	.845
N-BUTANE	.969	2.840	4.058	1.563	1.458	2.089
ISOPENTANE	.270	.980	2.906	1.390	.687	1.221
N-PENTANE	.289	1.050	4.141	1.980	.898	1.597
NEOHEXANE	.007	.029	.172	.098	.033	.070
CYCLOPENTANE	.009	.031	.287	.133	.053	.091
2,3-DIMETHYLBUTANE	.007	.031	.243	.139	.044	.094
2-METHYLPENTANE	.047	.206	1.713	.978	.311	.660
3-METHYLPENTANE	.027	.115	1.044	.596	.188	.398
N-HEXANE	.078	.337	3.538	2.021	.625	1.327
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.020	.085	1.121	.625	.194	.4[illegible]
2,4-DIMETHYLPENTANE	.003	.016	.148	.098	.026	.0[illegible]
BENZENE	.013	.051	.895	.463	.152	.293
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.018	.077	1.391	.776	.235	.488
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.012	.062	.976	.648	.165	.407
2,3-DIMETHYLPENTANE	.004	.022	.357	.237	.060	.149
3-METHYLHEXANE	.012	.059	1.003	.666	.168	.416
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.003	.013	.178	.116	.030	.073
1-TRANS-3-DMCP	.002	.010	.231	.151	.038	.093
1-TRANS-2-DMCP	.003	.015	.285	.185	.048	.115
3-ETHYLPENTANE						

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TABLE IV (continued)

N-HEPTANE	.027	.139	2.964	1.968	.492	1.215
2,2-DIMETHYLHEXANE			2.141	1.621	.339	.954
1-CIS-2-DMCP	.001	.004	.107	.069	.018	.043
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.019	.092			.016	.038
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.001	.006	.122	.093	.020	.057
2,4-DIMETHYLHEXANE	.002	.010	.237	.179	.039	.110
2,2,3-TRIMETHYLPENTANE			.008	.006	.001	.003
1-TRANS-2-CIS-4-TMCP	.001	.004	.086	.064	.014	.039
TOLUENE	.013	.059			.011	.024
3,3-DIMETHYLHEXANE			1.835	1.390	.290	.818
1-TRANS-2-CIS-3-TMCP			.055	.041	.009	.024
2,3-DIMETHYLHEXANE	.001	.005	.138	.104	.022	.063
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.857	.648	.136	.382
4-METHYLHEPTANE	.004	.023			.003	.010
3,4-DIMETHYLHEXANE	.001	.008	.268	.203	.044	.123
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.038	.029	.006	.017
3-METHYLHEPTANE	.003	.020	.765	.579	.124	.349
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.008	.006	.001	.003
2,2,5-TRMETHYLHEXANE			.020	.017	.003	.010
1,1-DIMETHYLCYCLOHEXANE	.004	.021			.003	.009
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.615	.457	.097	.269
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.000	.002			.000	.001
1-ME-3-ETHYLCYCLOPENTANE	.000	.001	.163	.122	.026	.072
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.007	.039	2.661	2.015	.427	1.201
2,4,4-TRIMETHYLHEXANE	.000	.000	.027	.023	.004	.010
2,3,3-TRIMETHYLHEXANE	.000	.001	.034	.029	.005	.011
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE	.000	.002			.000	.001
---UNIDENTIFIED---			.102	.087	.016	.051
2,4-DIMETHYLHEPTANE	.000	.002	.204	.174	.033	.103
3,5-DIMETHYLHEPTANE			.272	.232	.043	.136
2,5-DIMETHYLHEPTANE	.001	.004			.000	.001
ETHYLCYCLOHEXANE	.001	.007	.529	.394	.085	.234
ETHYLBENZENE	.000	.002	.197	.139	.032	.083

TABLE IV (concluded)

1-CIS-3-CIS-5-TMCH	.000	.003			.000	.001
---UNIDENTIFIED---	.000	.000	.179	.151	.028	.089
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.007	.006	.001	.003
PARA-XYLENE	.001	.003	.370	.261	.059	.155
META-XYLENE	.002	.013	1.522	1.071	.243	.635
2,3-DIMETHYLHEPTANE	.000	.001	.102	.087	.016	.052
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.001	.004	.436	.371	.069	.220
2-METHYLOCTANE	.000	.001	.361	.307	.057	.181
3-ETHYLHEPTANE			.055	.046	.009	.027
3-METHYLOCTANE	.001	.004	.395	.336	.063	.19
ORTHO-XYLENE	.001	.003	.518	.365	.082	.216
2,2,4-TRIMETHYLHEPTANE	.000	.001	.012	.012	.002	.007
2,2,5-TRIMETHYLHEPTANE			.006	.006	.001	.003
2,2,6-TRIMETHYLHEPTANE			.049	.046	.008	.027
2,5,5-TRIMETHYLHEPTANE			.025	.023	.004	.014
2,4,4-TRIMETHYLHEPTANE			.012	.012	.002	.007
ISOPROPYLBENZENE			.094	.075	.015	.044
N-NONANE	.001	.007	1.900	1.615	.302	.953
N-PROPYLBENZENE			.044	.035	.007	.020
1-METHYL-3-ETHYLBENZENE			.254	.203	.040	.119
1-METHYL-4-ETHYLBENZENE			.153	.122	.024	.072
1-METHYL-2-ETHYLBENZENE			.145	.116	.023	.068
1,3,5-TRIMETHYLBENZENE			.625	.498	.099	.293
1,2,4-TRIMETHYLBENZENE			.618	.492	.098	.290
1,2,3-TRIMETHYLBENZENE			.422	.336	.067	.198
N-DECANE			1.762	1.662	.279	.978
C-9 NAPTHENES			.173	.145	.027	.085
C-10 PARAFFINS +NAPHTHS.			3.042	2.848	.481	1.67
C-10 BENZENES						
UNDECANES			3.482	3.607	.551	2.122
N-UNDECANE			1.582	1.638	.250	.964
DODECANES			2.287	2.582	.362	1.519
N-DODECANE			1.262	1.424	.200	.838
TRIDECANES			2.331	2.848	.369	1.676
N-TRIDECANE			1.028	1.256	.163	.739
TETRADECANES			1.748	2.298	.277	1.352
N-TETRADECANE			1.105	1.453	.175	.855
PENTADECANES			1.435	2.021	.227	1.189
N-PENTADECANE			.662	.932	.105	.548
HEXADECANES AND HEAVIER	.000	.003	27.731	44.200	4.388	26.008

TABLE V

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGP = GAS SAMPLE AHGQ = LIQUID SAMPLE

DST No. 2, Flow 3, 10,810-860 & 10,730-780 Feet, 2/4-5X Well

COMPONENT	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.353	.490			.285	.166
CARBON DIOXIDE	1.965	4.290			1.590	1.455
HYDROGEN SULFIDE						
METHANE	82.801	65.880			66.995	22.350
ETHANE	8.610	12.840	.073	.013	6.980	4.365
PROPANE	3.791	8.290	.859	.228	3.231	2.963
ISOBUTANE	.611	1.760	.664	.232	.621	.750
N-BUTANE	.940	2.710	2.632	.919	1.263	1.527
ISOPENTANE	.229	.820	2.161	.937	.598	.897
N-PENTANE	.240	.860	3.120	1.352	.790	1.185
NEOHEXANE	.006	.026	.161	.083	.036	.064
CYCLOPENTANE	.043	.150	.249	.105	.082	.120
2,3-DIMETHYLBUTANE	.008	.036	.203	.105	.045	.082
2-METHYLPENTANE	.053	.225	1.395	.722	.309	.553
3-METHYLPENTANE	.029	.124	.896	.464	.195	.349
N-HEXANE	.081	.348	2.976	1.541	.634	1.136
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.024	.099	.978	.495	.206	.3[illegible]
2,4-DIMETHYLPENTANE	.003	.014	.174	.105	.036	.0[illegible]
BENZENE	.022	.085	.970	.455	.203	.330
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.028	.119	1.298	.656	.271	.474
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.014	.071	.858	.516	.175	.365
2,3-DIMETHYLPENTANE	.005	.023	.364	.219	.073	.153
3-METHYLHEXANE	.013	.067	.901	.543	.183	.381
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.003	.014	.208	.123	.042	.086
1-TRANS-3-DMCP	.002	.010	.237	.140	.047	.096
1-TRANS-2-DMCP	.003	.016	.393	.232	.078	.159
3-ETHYLPENTANE						

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TABLE V (continued)

N-HEPTANE	.0[illegible]	.158	2.486	1.497	.500	1.043
2,2-DIMETHYLHEXANE			1.818	1.247	.347	.824
1-CIS-2-DMCP	.001	.004	.089	.053	.018	.036
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.023	.111			.019	.038
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.001	.004	.108	.074	.021	.051
2,4-DIMETHYLHEXANE	.002	.011	.210	.144	.042	.099
2,2,3-TRIMETHYLPENTANE			.013	.009	.002	.006
1-TRANS-2-CIS-4-TMCP	.001	.003	.078	.053	.015	.036
TOLUENE	.018	.082			.014	.028
3,3-DIMETHYLHEXANE			1.556	1.068	.297	.706
1-TRANS-2-CIS-3-TMCP			.065	.044	.012	.029
2,3-DIMETHYLHEXANE	.000	.003	.159	.109	.031	.073
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.746	.512	.142	.3[illegible]
4-METHYLHEPTANE	.005	.031			.004	.011
3,4-DIMETHYLHEXANE	.001	.008	.249	.171	.049	.115
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.045	.031	.009	.020
3-METHYLHEPTANE	.004	.025	.682	.468	.134	.318
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.039	.026	.007	.017
2,2,5-TRMETHYLHEXANE			.034	.026	.007	.017
1,1-DIMETHYLCYCLOHEXANE	.005	.028			.004	.009
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.526	.355	.100	.234
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE						
1-ME-3-ETHYLCYCLOPENTANE			.149	.101	.029	.067
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.011	.063	2.270	1.558	.442	1.051
2,4,4-TRIMETHYLHEXANE			.034	.026	.007	.0[illegible]
2,3,3-TRIMETHYLHEXANE			.051	.039	.010	.0[illegible]
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE						
---UNIDENTIFIED---			.102	.079	.020	.052
2,4-DIMETHYLHEPTANE	.001	.004	.187	.144	.036	.097
3,5-DIMETHYLHEPTANE			.256	.197	.049	.130
2,5-DIMETHYLHEPTANE	.001	.005			.001	.002
ETHYLCYCLOHEXANE	.002	.013	.467	.315	.091	.213
ETHYLBENZENE			.192	.123	.037	.081

TABLE V (concluded)

1-CIS-3-CIS-5-TMCH						
---UNIDENTIFIED---			.177	.136	.034	.090
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.028	.022	.005	.014
PARA-XYLENE	.001	.007	.350	.223	.068	.150
META-XYLENE	.005	.027	1.352	.862	.262	.579
2,3-DIMETHYLHEPTANE			.125	.096	.024	.064
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.001	.005	.392	.302	.076	.201
2-METHYLOCTANE	.001	.009	.329	.254	.064	.171
3-ETHYLHEPTANE			.074	.057	.014	.0[illegible]
3-METHYLOCTANE	.001	.005	.364	.280	.070	.18[illegible]
ORTHO-XYLENE	.001	.006	.494	.315	.095	.210
2,2,4-TRIMETHYLHEPTANE			.020	.018	.004	.012
2,2,5-TRIMETHYLHEPTANE			.036	.031	.007	.020
2,2,[illegible]-TRIMETHYLHEPTANE			.036	.031	.007	.020
2,5,5-TRIMETHYLHEPTANE			.020	.018	.004	.012
2,4,4-TRIMETHYLHEPTANE			.010	.009	.002	.006
ISOPROPYLBENZENE			.079	.057	.015	.038
N-NONANE			1.613	1.243	.308	.821
N-PROPYLBENZENE			.036	.026	.007	.017
1-METHYL-3-ETHYLBENZENE			.218	.158	.042	.104
1-METHYL-4-ETHYLBENZENE			.121	.088	.023	.058
1-METHYL-2-ETHYLBENZENE			.103	.074	.020	.049
1,3,5-TRIMETHYLBENZENE			.491	.355	.094	.234
1,2,4-TRIMETHYLBENZENE			.467	.337	.089	.223
1,2,3-TRIMETHYLBENZENE			.158	.114	.030	.075
N-DECANE	.004	.025	1.300	1.112	.251	.743
C-9 NAPTHENES			.138	.105	.026	.069
C-10 PARAFFINS +NAPHTHS.			2.243	1.904	.428	1.2[illegible]
C-10 BENZENES						
UNDECANES			3.588	3.370	.685	2.227
N-UNDECANE			1.496	1.405	.286	.928
DODECANES			2.865	2.932	.547	1.938
N-DODECANE			1.172	1.199	.224	.792
TRIDECANES			2.864	3.173	.547	2.097
N-TRIDECANE			.664	.735	.127	.486
TETRADECANES			1.564	1.864	.299	1.232
N-TETRADECANE			.576	.687	.110	.454
PENTADECANES			.487	.621	.093	.411
N-PENTADECANE			.185	.236	.035	.156
HEXADECANES AND HEAVIER			39.380	56.900	7.517	37.597

TABLE VI

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGR = GAS SAMPLE AHGS = LIQUID SAMPLE

DST No. 4, Flow 1, 10,480-550 Feet, 2/4-5X Well

	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
COMPONENT	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.361	.520			.265	.136
CARBON DIOXIDE	2.034	4.610			1.495	1.208
HYDROGEN SULFIDE						
METHANE	84.459	69.760			62.048	18.280
ETHANE	8.669	13.420	.109	.022	6.397	3.533
PROPANE	2.982	6.770	1.686	.491	2.638	2.136
ISOBUTANE	.381	1.140	1.139	.437	.582	.621
N-BUTANE	.698	2.090	4.414	1.694	1.684	1.798
ISOPENTANE	.140	.520	2.933	1.397	.881	1.167
N-PENTANE	.140	.520	4.303	2.050	1.245	1.649
NEOHEXANE	.003	.014	.180	.103	.050	.079
CYCLOPENTANE	.004	.016	.315	.146	.087	.112
2,3-DIMETHYLBUTANE	.002	.010	.228	.129	.062	.098
2-METHYLPENTANE	.015	.065	1.640	.933	.446	.706
3-METHYLPENTANE	.009	.039	1.024	.583	.278	.440
N-HEXANE	.021	.095	3.489	1.985	.942	1.490
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.007	.030	1.262	.701	.340	.525
2,4-DIMETHYLPENTANE	.001	.007	.196	.129	.053	.0
BENZENE	.006	.026	1.057	.545	.285	.409
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.008	.034	1.417	.788	.382	.590
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.003	.016	.897	.593	.240	.442
2,3-DIMETHYLPENTANE	.002	.010	.351	.232	.094	.174
3-METHYLHEXANE	.003	.016	.938	.620	.251	.462
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.001	.006	.200	.129	.054	.097
1-TRANS-3-DMCP	.001	.007	.250	.162	.067	.121
1-TRANS-2-DMCP	.003	.014	.366	.237	.099	.179
3-ETHYLPENTANE						

TABLE VI (continued)

N-HEPTANE	.008	.041	2.878	1.905	.770	1.416
2,2-DIMETHYLHEXANE			2.132	1.608	.566	1.187
1-CIS-2-DMCP	.003	.016	.092	.059	.027	.048
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.005	.025			.004	.007
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.001	.006	.114	.086	.031	.065
2,4-DIMETHYLHEXANE	.002	.013	.236	.178	.064	.135
2,2,3-TRIMETHYLPENTANE			.014	.011	.004	.008
1-TRANS-2-CIS-4-TMCP	.001	.006	.095	.070	.026	.053
TOLUENE	.008	.039			.006	.010
3,3-DIMETHYLHEXANE			1.810	1.365	.480	1.007
1-TRANS-2-CIS-3-TMCP			.080	.059	.021	.044
2,3-DIMETHYLHEXANE	.002	.013	.186	.140	.051	.107
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.815	.615	.216	.45
4-METHYLHEPTANE	.001	.008			.001	.002
3,4-DIMETHYLHEXANE	.001	.007	.279	.210	.075	.157
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.057	.043	.015	.032
3-METHYLHEPTANE	.003	.018	.737	.555	.198	.415
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.044	.032	.012	.024
2,2,5-TRMETHYLHEXANE			.045	.038	.012	.028
1,1-DIMETHYLCYCLOHEXANE	.005	.027			.003	.007
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.604	.448	.160	.330
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.001	.007			.001	.002
1-ME-3-ETHYLCYCLOPENTANE	.000	.002	.182	.135	.049	.100
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.001	.006	2.489	1.878	.661	1.387
2,4,4-TRIMETHYLHEXANE			.038	.032	.010	.024
2,3,3-TRIMETHYLHEXANE			.038	.032	.010	.0
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE						
---UNIDENTIFIED---			.102	.086	.027	.064
2,4-DIMETHYLHEPTANE			.191	.162	.051	.119
3,5-DIMETHYLHEPTANE			.312	.264	.083	.195
2,5-DIMETHYLHEPTANE	.000	.000			.000	.000
ETHYLCYCLOHEXANE	.000	.001	.502	.372	.134	.275
ETHYLBENZENE			.216	.151	.057	.111

TABLE VI (concluded)

1-CIS-3-CIS-5-TMCH						
---UNIDENTIFIED---			.257	.215	.068	.159
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.006	.005	.002	.004
PARA-XYLENE	.000	.000	.393	.275	.104	.203
META-XYLENE	.001	.003	1.532	1.074	.407	.793
2,3-DIMETHYLHEPTANE	.000	.002	.140	.119	.037	.088
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE			.401	.340	.107	.251
2-METHYLOCTANE			.395	.335	.105	.247
3-ETHYLHEPTANE			.083	.070	.022	.052
3-METHYLOCTANE	.000	.001	.401	.340	.107	.25
ORTHO-XYLENE	.000	.002	.600	.421	.160	.311
2,2,4-TRIMETHYLHEPTANE			.029	.027	.008	.020
2,2,5-TRIMETHYLHEPTANE			.040	.038	.011	.028
2,2,6-TRIMETHYLHEPTANE			.057	.054	.015	.040
2,5,5-TRIMETHYLHEPTANE			.017	.016	.005	.012
2,4,4-TRIMETHYLHEPTANE			.040	.038	.011	.028
ISOPROPYLBENZENE			.068	.054	.018	.040
N-NONANE	.000	.002	1.803	1.527	.479	1.127
N-PROPYLBENZENE			.041	.032	.011	.024
1-METHYL-3-ETHYLBENZENE			.299	.237	.079	.175
1-METHYL-4-ETHYLBENZENE			.150	.119	.040	.088
1-METHYL-2-ETHYLBENZENE			.129	.103	.034	.076
1,3,5-TRIMETHYLBENZENE			.571	.453	.152	.334
1,2,4-TRIMETHYLBENZENE			.578	.459	.153	.338
1,2,3-TRIMETHYLBENZENE			.190	.151	.051	.111
N-DECANE			1.476	1.387	.392	1.023
C-9 NAPTHENES			.181	.151	.048	.111
C-10 PARAFFINS +NAPHTHS.			2.765	2.579	.734	1.90
C-10 BENZENES						
UNDECANES			3.272	3.377	.868	2.492
N-UNDECANE			1.469	1.516	.390	1.119
DODECANES			2.226	2.503	.591	1.847
N-DODECANE			1.309	1.473	.347	1.087
TRIDECANES			1.928	2.347	.512	1.732
N-TRIDECANE			1.139	1.387	.302	1.023
TETRADECANES			1.038	1.360	.275	1.003
N-TETRADECANE			.873	1.144	.232	.844
PENTADECANES			.719	1.009	.191	.745
N-PENTADECANE			.746	1.047	.198	.772
HEXADECANES AND HEAVIER	.000	.001	29.957	47.574	7.949	35.108

TABLE VII

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGT = GAS SAMPLE AHGU = LIQUID SAMPLE

DST No. 4, Flow 2, 10,480-550 Feet, 2/4-5X Well

	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
COMPONENT	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.362	.510			.284	.168
CARBON DIOXIDE	2.003	4.443			1.576	1.460
HYDROGEN SULFIDE						
METHANE	83.634	67.606			65.769	22.222
ETHANE	8.612	13.049	.087	.017	6.791	4.301
PROPANE	3.211	7.135	1.514	.448	2.849	2.646
ISOBUTANE	.472	1.381	1.059	.413	.597	.731
N-BUTANE	.919	2.692	4.103	1.598	1.599	1.958
ISOPENTANE	.239	.871	2.909	1.406	.810	1.230
N-PENTANE	.259	.941	4.315	2.086	1.125	1.710
NEOHEXANE	.005	.022	.141	.081	.034	.062
CYCLOPENTANE	.007	.026	.334	.157	.077	.114
2,3-DIMETHYLBUTANE	.006	.024	.252	.145	.058	.106
2-METHYLPENTANE	.034	.146	1.761	1.017	.403	.731
3-METHYLPENTANE	.018	.079	1.087	.628	.247	.447
N-HEXANE	.054	.236	3.764	2.174	.847	1.537
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.015	.064	1.309	.738	.291	.51[illegible]
2,4-DIMETHYLPENTANE	.002	.011	.164	.110	.037	.0[illegible]
BENZENE	.011	.043	.944	.494	.210	.346
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.016	.066	1.618	.912	.358	.634
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.008	.043	.995	.668	.219	.463
2,3-DIMETHYLPENTANE	.004	.019	.389	.262	.086	.182
3-METHYLHEXANE	.008	.042	1.030	.692	.226	.478
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.002	.012	.203	.134	.045	.094
1-TRANS-3-DMCP	.002	.011	.265	.174	.058	.121
1-TRANS-2-DMCP	.004	.019	.336	.221	.075	.155
3-ETHYLPENTANE						

TABLE VII (continued)

N-HEPTANE	.021	.107	3.133	2.104	.686	1.447
2,2-DIMETHYLHEXANE			2.414	1.848	.516	1.241
1-CIS-2-DMCP	.001	.003	.106	.070	.023	.048
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.013	.063			.010	.021
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.001	.003	.121	.093	.026	.064
2,4-DIMETHYLHEXANE	.001	.007	.258	.198	.056	.135
2,2,3-TRIMETHYLPENTANE			.008	.006	.002	.004
1-TRANS-2-CIS-4-TMCP	.001	.003	.100	.076	.022	.052
TOLUENE	.009	.041			.007	.013
3,3-DIMETHYLHEXANE			1.928	1.476	.412	.991
1-TRANS-2-CIS-3-TMCP			.070	.052	.015	.035
2,3-DIMETHYLHEXANE	.001	.003	.182	.139	.039	.095
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.919	.703	.196	.47
4-METHYLHEPTANE	.003	.015			.002	.005
3,4-DIMETHYLHEXANE	.001	.006	.304	.232	.066	.158
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.053	.041	.011	.027
3-METHYLHEPTANE	.002	.014	.797	.610	.172	.414
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.008	.006	.002	.004
2,2,5-TRMETHYLHEXANE			.007	.006	.001	.004
1,1-DIMETHYLCYCLOHEXANE	.004	.022			.003	.007
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.688	.517	.147	.347
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.000	.002			.000	.001
1-ME-3-ETHYLCYCLOPENTANE	.000	.002	.201	.151	.043	.102
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.005	.031	2.816	2.156	.606	1.457
2,4,4-TRIMETHYLHEXANE			.041	.035	.009	.02
2,3,3-TRIMETHYLHEXANE			.068	.058	.014	.01
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE	.001	.005			.001	.002
---UNIDENTIFIED---			.128	.110	.027	.074
2,4-DIMETHYLHEPTANE	.001	.005	.237	.203	.051	.138
3,5-DIMETHYLHEPTANE	.001	.009	.325	.279	.070	.190
2,5-DIMETHYLHEPTANE	.002	.013			.002	.004
ETHYLCYCLOHEXANE	.002	.012	.618	.465	.134	.316
ETHYLBENZENE			.253	.180	.054	.121

TABLE VII (concluded)

1-CIS-3-CIS-5-TMCH	.003	.020			.003	.007
---UNIDENTIFIED---	.002	.014	.245	.209	.054	.145
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.041	.035	.009	.023
PARA-XYLENE	.001	.006	.433	.308	.093	.209
META-XYLENE	.004	.021	1.666	1.186	.359	.803
2,3-DIMETHYLHEPTANE			.088	.076	.019	.051
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.002	.014	.392	.337	.085	.231
2-METHYLOCTANE	.002	.013	.419	.360	.091	.246
3-ETHYLHEPTANE			.047	.041	.010	.027
3-METHYLOCTANE	.002	.014	.392	.337	.085	.231
ORTHO-XYLENE	.002	.013	.564	.401	.122	.273
2,2,4-TRIMETHYLHEPTANE			.006	.006	.001	.004
2,2,5-TRIMETHYLHEPTANE			.006	.006	.001	.004
2,2,6-TRIMETHYLHEPTANE			.061	.058	.013	.039
2,5,5-TRIMETHYLHEPTANE			.030	.029	.007	.020
2,4,4-TRIMETHYLHEPTANE			.030	.029	.007	.020
ISOPROPYLBENZENE			.072	.058	.015	.039
N-NONANE	.002	.012	2.008	1.726	.430	1.163
N-PROPYLBENZENE			.036	.029	.008	.020
1-METHYL-3-ETHYLBENZENE			.310	.250	.066	.168
1-METHYL-4-ETHYLBENZENE			.152	.122	.032	.082
1-METHYL-2-ETHYLBENZENE			.123	.099	.026	.066
1,3,5-TRIMETHYLBENZENE			.577	.465	.123	.312
1,2,4-TRIMETHYLBENZENE			.584	.471	.125	.316
1,2,3-TRIMETHYLBENZENE			.202	.163	.043	.109
N-DECANE	.000	.002	1.633	1.558	.349	1.046
C-9 NAPTHENES			.192	.163	.041	.109
C-10 PARAFFINS +NAPHTHS.			2.590	2.453	.553	1.646
C-10 BENZENES						
UNDECANES			3.290	3.446	.703	2.314
N-UNDECANE			1.559	1.633	.333	1.096
DODECANES			2.148	2.453	.459	1.646
N-DODECANE			1.344	1.534	.287	1.030
TRIDECANES			1.298	1.604	.277	1.077
N-TRIDECANE			1.143	1.412	.244	.948
TETRADECANES			.975	1.296	.208	.870
N-TETRADECANE			1.167	1.552	.249	1.042
PENTADECANES			.910	1.296	.194	.870
N-PENTADECANE			.951	1.354	.203	.909
HEXADECANES AND HEAVIER	.002	.020	27.955	45.057	5.973	30.254

TABLE VIII

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGV = GAS SAMPLE AHGW = LIQUID SAMPLE

DST No. 4, Flow 3, 10,480-550 Feet, 2/4-5X Well

COMPONENT	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.370	.520			.278	.146
CARBON DIOXIDE	2.184	4.824			1.637	1.354
HYDROGEN SULFIDE						
METHANE	83.366	67.106			62.490	18.830
ETHANE	8.657	13.061	.168	.033	6.531	3.689
PROPANE	3.234	7.156	1.926	.555	2.907	2.408
ISOBUTANE	.470	1.371	1.143	.434	.639	.697
N-BUTANE	.909	2.652	4.225	1.606	1.740	1.899
ISOPENTANE	.229	.831	2.774	1.309	.867	1.175
N-PENTANE	.249	.901	4.068	1.919	1.205	1.633
NEOHEXANE	.004	.017	.156	.088	.042	.068
CYCLOPENTANE	.008	.029	.312	.143	.084	.111
2,3-DIMETHYLBUTANE	.006	.025	.224	.125	.061	.098
2-METHYLPENTANE	.040	.172	1.610	.907	.433	.701
3-METHYLPENTANE	.021	.093	.976	.550	.260	.422
N-HEXANE	.064	.278	3.387	1.908	.896	1.451
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.017	.073	1.189	.654	.311	.4[illegible]
2,4-DIMETHYLPENTANE	.002	.011	.143	.093	.037	.0[illegible]
BENZENE	.011	.043	.818	.418	.213	.313
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.014	.061	1.459	.803	.376	.595
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.010	.048	.915	.599	.236	.445
2,3-DIMETHYLPENTANE	.004	.019	.361	.236	.093	.175
3-METHYLHEXANE	.009	.046	.948	.621	.244	.460
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.002	.011	.206	.132	.053	.098
1-TRANS-3-DMCP	.002	.010	.248	.159	.064	.117
1-TRANS-2-DMCP	.003	.015	.334	.214	.086	.159
3-ETHYLPENTANE						

TABLE VIII (continued)

N-HEPTANE	.022	.112	2.845	1.864	.729	1.372
2,2-DIMETHYLHEXANE			2.209	1.650	.553	1.187
1-CIS-2-DMCP	.001	.003	.103	.066	.026	.048
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.015	.074			.011	.021
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.001	.004	.118	.088	.030	.064
2,4-DIMETHYLHEXANE	.001	.008	.236	.176	.060	.129
2,2,3-TRIMETHYLPENTANE			.015	.011	.004	.008
1-TRANS-2-CIS-4-TMCP	.001	.004	.090	.066	.023	.048
TOLUENE	.010	.044			.007	.012
3,3-DIMETHYLHEXANE			1.723	1.287	.431	.926
1-TRANS-2-CIS-3-TMCP			.030	.022	.008	.016
2,3-DIMETHYLHEXANE	.000	.003	.133	.099	.034	.072
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.817	.610	.205	.43
4-METHYLHEPTANE	.003	.019			.003	.005
3,4-DIMETHYLHEXANE	.001	.007	.250	.187	.064	.137
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.037	.028	.009	.020
3-METHYLHEPTANE	.003	.017	.714	.533	.181	.389
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.008	.006	.002	.004
2,2,5-TRMETHYLHEXANE			.020	.017	.005	.012
1,1-DIMETHYLCYCLOHEXANE	.004	.024			.003	.007
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.630	.462	.158	.332
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.000	.002			.000	.001
1-ME-3-ETHYLCYCLOPENTANE	.000	.003	.180	.132	.045	.096
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.006	.036	2.555	1.908	.644	1.383
2,4,4-TRIMETHYLHEXANE			.026	.022	.007	.01
2,3,3-TRIMETHYLHEXANE			.013	.011	.003	.0
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE	.001	.003			.000	.001
---UNIDENTIFIED---			.098	.082	.025	.059
2,4-DIMETHYLHEPTANE	.001	.005	.190	.159	.048	.116
3,5-DIMETHYLHEPTANE			.269	.225	.067	.162
2,5-DIMETHYLHEPTANE	.001	.007			.001	.002
ETHYLCYCLOHEXANE	.002	.014	.555	.407	.141	.297
ETHYLBENZENE	.000	.002	.206	.143	.052	.104

TABLE VIII (concluded)

1-CIS-3-CIS-5-TMCH	.002	.011			.001	.003
---UNIDENTIFIED---			.231	.192	.058	.138
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.007	.006	.002	.004
PARA-XYLENE	.003	.016	.380	.264	.097	.194
META-XYLENE	.006	.032	1.537	1.067	.389	.776
2,3-DIMETHYLHEPTANE	.001	.008	.125	.104	.032	.077
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.003	.018	.374	.313	.096	.230
2-METHYLOCTANE	.002	.016	.420	.352	.107	.258
3-ETHYLHEPTANE			.066	.055	.016	.04
3-METHYLOCTANE	.004	.028	.387	.324	.100	.24
ORTHO-XYLENE	.008	.042	.578	.401	.151	.301
2,2,4-TRIMETHYLHEPTANE	.001	.010	.018	.017	.005	.015
2,2,5-TRIMETHYLHEPTANE			.006	.006	.001	.004
2,2,6-TRIMETHYLHEPTANE			.059	.055	.015	.040
2,5,5-TRIMETHYLHEPTANE			.059	.055	.015	.040
2,4,4-TRIMETHYLHEPTANE						
ISOPROPYLBENZENE			.091	.071	.023	.051
N-NONANE	.003	.021	1.836	1.540	.462	1.114
N-PROPYLBENZENE			.042	.033	.011	.024
1-METHYL-3-ETHYLBENZENE			.259	.203	.065	.146
1-METHYL-4-ETHYLBENZENE			.147	.115	.037	.083
1-METHYL-2-ETHYLBENZENE			.119	.093	.030	.067
1,3,5-TRIMETHYLBENZENE			.574	.451	.144	.324
1,2,4-TRIMETHYLBENZENE			.574	.451	.144	.324
1,2,3-TRIMETHYLBENZENE			.245	.192	.061	.138
N-DECANE	.001	.005	1.549	1.441	.388	1.038
C-9 NAPTHENES			.180	.148	.045	.107
C-10 PARAFFINS +NAPHTHS.			2.691	2.485	.674	1.7
C-10 BENZENES						
UNDECANES			3.261	3.332	.817	2.397
N-UNDECANE			1.533	1.567	.384	1.127
DODECANES			2.029	2.260	.508	1.626
N-DODECANE			1.210	1.347	.303	.969
TRIDECANES			2.094	2.524	.524	1.816
N-TRIDECANE			.994	1.199	.249	.862
TETRADECANES			1.200	1.556	.300	1.120
N-TETRADECANE			1.072	1.391	.269	1.001
PENTADECANES			1.061	1.474	.266	1.060
N-PENTADECANE			.705	.979	.176	.704
HEXADECANES AND HEAVIER	.003	.031	30.628	48.161	7.672	34.656

TABLE IX

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGX = GAS SAMPLE AHGY = LIQUID SAMPLE

DST No. 5, Flow 1, 10,250-340 Feet, 2/4-5X Well

COMPONENT	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.382	.550			.333	.263
CARBON DIOXIDE	2.027	4.591			1.769	2.198
HYDROGEN SULFIDE						
METHANE	84.598	69.842			73.814	33.447
ETHANE	8.441	13.062	.146	.030	7.384	6.271
PROPANE	3.024	6.861	2.194	.668	2.918	3.634
ISOBUTANE	.381	1.140	1.422	.571	.514	.844
N-BUTANE	.699	2.090	5.281	2.121	1.283	2.106
ISOPENTANE	.140	.520	3.389	1.689	.554	1.129
N-PENTANE	.151	.560	4.888	2.437	.755	1.538
NEOHEXANE	.003	.015	.184	.109	.026	.064
CYCLOPENTANE	.004	.015	.401	.194	.055	.109
2,3-DIMETHYLBUTANE	.003	.012	.276	.164	.038	.091
2-METHYLPENTANE	.018	.081	1.908	1.136	.259	.631
3-METHYLPENTANE	.010	.043	1.194	.711	.161	.391
N-HEXANE	.028	.123	3.909	2.327	.522	1.272
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.008	.034	1.275	.741	.169	.4[illegible]
2,4-DIMETHYLPENTANE	.001	.005	.158	.109	.021	.0[illegible]
BENZENE	.005	.020	.867	.468	.115	.253
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.007	.031	1.526	.887	.201	.477
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.004	.021	.983	.681	.129	.365
2,3-DIMETHYLPENTANE	.002	.008	.386	.267	.051	.143
3-METHYLHEXANE	.004	.020	1.018	.705	.133	.377
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.001	.005	.206	.140	.027	.075
1-TRANS-3-DMCP	.001	.004	.260	.176	.034	.094
1-TRANS-2-DMCP	.001	.006	.331	.225	.043	.120
3-ETHYLPENTANE						

TABLE IX (continued)

N-HEPTANE	.010	.051	3.010	2.084	.392	1.111
2,2-DIMETHYLHEXANE			2.233	1.762	.285	.918
1-CIS-2-DMCP	.000	.002	.107	.073	.014	.039
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.007	.038			.007	.018
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.000	.002	.115	.091	.015	.048
2,4-DIMETHYLHEXANE	.001	.004	.246	.194	.032	.103
2,2,3-TRIMETHYLPENTANE			.015	.012	.002	.006
1-TRANS-2-CIS-4-TMCP	.000	.001	.094	.073	.012	.039
TOLUENE	.005	.024			.004	.012
3,3-DIMETHYLHEXANE			1.786	1.410	.228	.735
1-TRANS-2-CIS-3-TMCP			.055	.043	.007	.022
2,3-DIMETHYLHEXANE	.000	.002	.162	.128	.021	.067
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.862	.681	.110	.3
4-METHYLHEPTANE	.002	.012			.002	.006
3,4-DIMETHYLHEXANE	.001	.004	.277	.219	.036	.116
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.046	.036	.006	.019
3-METHYLHEPTANE	.002	.011	.762	.602	.099	.319
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.039	.030	.005	.016
2,2,5-TRMETHYLHEXANE			.034	.030	.004	.016
1,1-DIMETHYLCYCLOHEXANE	.003	.015			.002	.007
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.635	.492	.081	.256
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.000	.001			.000	.000
1-ME-3-ETHYLCYCLOPENTANE			.212	.164	.027	.086
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.004	.025	2.641	2.084	.340	1.098
2,4,4-TRIMETHYLHEXANE			.041	.036	.005	.01
2,3,3-TRIMETHYLHEXANE			.007	.006	.001	.0
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE	.000	.001			.000	.001
---UNIDENTIFIED---			.123	.109	.016	.057
2,4-DIMETHYLHEPTANE	.000	.002	.219	.194	.028	.102
3,5-DIMETHYLHEPTANE			.295	.261	.038	.136
2,5-DIMETHYLHEPTANE	.001	.004			.001	.002
ETHYLCYCLOHEXANE	.002	.009	.556	.431	.072	.229
ETHYLBENZENE	.001	.004	.215	.158	.028	.084

TABLE IX (concluded)

1-CIS-3-CIS-5-TMCH	.001	.007			.001	.003
---UNIDENTIFIED---			.152	.134	.019	.070
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.007	.006	.001	.003
PARA-XYLENE	.001	.007	.348	.255	.045	.136
META-XYLENE	.002	.011	1.450	1.063	.187	.559
2,3-DIMETHYLHEPTANE			.103	.091	.013	.048
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.003	.022	.343	.304	.047	.169
2-METHYLOCTANE	.003	.020	.418	.371	.056	.203
3-ETHYLHEPTANE	.000	.002	.055	.049	.007	.02
3-METHYLOCTANE	.001	.007	.370	.328	.048	.1
ORTHO-XYLENE	.002	.009	.505	.371	.066	.197
2,2,4-TRIMETHYLHEPTANE	.001	.007	.012	.012	.002	.010
2,2,5-TRIMETHYLHEPTANE			.012	.012	.002	.006
2,2,6-TRIMETHYLHEPTANE			.012	.012	.002	.006
2,5,5-TRIMETHYLHEPTANE			.049	.049	.006	.025
2,4,4-TRIMETHYLHEPTANE			.019	.018	.002	.010
ISOPROPYLBENZENE			.088	.073	.011	.038
N-NONANE	.003	.020	1.783	1.580	.230	.833
N-PROPYLBENZENE			.037	.030	.005	.016
1-METHYL-3-ETHYLBENZENE			.293	.243	.037	.127
1-METHYL-4-ETHYLBENZENE			.146	.122	.019	.063
1-METHYL-2-ETHYLBENZENE			.110	.091	.014	.048
1,3,5-TRIMETHYLBENZENE			.527	.438	.067	.228
1,2,4-TRIMETHYLBENZENE			.519	.431	.066	.225
1,2,3-TRIMETHYLBENZENE			.212	.176	.027	.092
N-DECANE	.000	.003	1.465	1.440	.187	.752
C-9 NAPTHENES			.167	.146	.021	.076
C-10 PARAFFINS +NAPHTHS.			2.646	2.582	.337	1.3
C-10 BENZENES						
UNDECANES			3.241	3.500	.413	1.824
N-UNDECANE			1.446	1.562	.184	.814
DODECANES			2.132	2.510	.272	1.308
N-DODECANE			1.151	1.355	.147	.706
TRIDECANES			2.237	2.850	.285	1.485
N-TRIDECANE			.954	1.215	.122	.633
TETRADECANES			1.729	2.370	.220	1.235
N-TETRADECANE			1.073	1.470	.137	.766
PENTADECANES			1.523	2.236	.194	1.165
N-PENTADECANE			.642	.942	.082	.491
HEXADECANES AND HEAVIER	.001	.018	25.035	41.602	3.193	21.688

TABLE X

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHGZ = GAS SAMPLE AHHA = LIQUID SAMPLE

DST No. 5, Flow 2, 10,250-340 Feet, 2/4-5X Well

COMPONENT	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.404	.560			.338	.222
CARBON DIOXIDE	2.003	4.360			1.674	1.725
HYDROGEN SULFIDE						
METHANE	82.545	65.491			68.983	25.917
ETHANE	8.850	13.160	.098	.019	7.412	5.219
PROPANE	3.540	7.720	1.035	.291	3.128	3.231
ISOBUTANE	.539	1.550	.785	.291	.580	.789
N-BUTANE	1.110	3.190	3.191	1.181	1.452	1.976
ISOPENTANE	.300	1.070	2.469	1.134	.656	1.109
N-PENTANE	.331	1.180	3.744	1.720	.892	1.506
NEOHEXANE	.006	.027	.162	.089	.032	.064
CYCLOPENTANE	.010	.034	.346	.155	.065	.107
2,3-DIMETHYLBUTANE	.007	.028	.239	.131	.045	.091
2-METHYLPENTANE	.045	.193	1.648	.905	.309	.623
3-METHYLPENTANE	.026	.111	1.042	.572	.193	.389
N-HEXANE	.075	.319	3.391	1.861	.620	1.250
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.021	.088	1.172	.628	.210	.4[illegible]
2,4-DIMETHYLPENTANE	.004	.017	.147	.094	.027	.0[illegible]
BENZENE	.019	.072	.858	.426	.157	.286
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.021	.089	1.461	.783	.258	.508
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.011	.056	.955	.609	.166	.390
2,3-DIMETHYLPENTANE	.006	.027	.323	.206	.058	.135
3-METHYLHEXANE	.011	.055	.955	.609	.166	.390
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.003	.016	.187	.117	.034	.077
1-TRANS-3-DMCP	.003	.016	.240	.150	.042	.097
1-TRANS-2-DMCP	.007	.033	.307	.192	.056	.129
3-ETHYLPENTANE						

TABLE X (continued)

N-HEPTANE	.028	.145	2.931	1.870	.506	1.187
2,2-DIMETHYLHEXANE			2.204	1.603	.362	.969
1-CIS-2-DMCP	.004	.017	.105	.066	.020	.046
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.019	.092			.016	.036
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.002	.011	.122	.089	.022	.058
2,4-DIMETHYLHEXANE	.003	.018	.245	.178	.043	.115
2,2,3-TRIMETHYLPENTANE			.019	.014	.003	.009
1-TRANS-2-CIS-4-TMCP	.007	.039	.098	.070	.022	.058
TOLUENE	.015	.066			.012	.026
3,3-DIMETHYLHEXANE			1.836	1.336	.302	.807
1-TRANS-2-CIS-3-TMCP			.072	.052	.012	.031
2,3-DIMETHYLHEXANE	.000	.002	.187	.136	.031	.083
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.876	.637	.144	.385
4-METHYLHEPTANE	.003	.018			.003	.007
3,4-DIMETHYLHEXANE	.001	.006	.290	.211	.048	.130
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.058	.042	.010	.025
3-METHYLHEPTANE	.003	.014	.786	.572	.131	.351
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.066	.047	.011	.028
2,2,5-TRMETHYLHEXANE			.040	.033	.007	.020
1,1-DIMETHYLCYCLOHEXANE	.003	.017			.003	.007
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.662	.473	.109	.286
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.000	.002			.000	.001
1-ME-3-ETHYLCYCLOPENTANE	.000	.000	.249	.178	.041	.108
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.006	.031	2.681	1.950	.445	1.190
2,4,4-TRIMETHYLHEXANE	.000	.000	.034	.028	.006	.008
2,3,3-TRIMETHYLHEXANE	.000	.001	.057	.047	.010	.029
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE	.000	.002			.000	.001
---UNIDENTIFIED---			.121	.098	.020	.059
2,4-DIMETHYLHEPTANE	.000	.002	.224	.183	.037	.111
3,5-DIMETHYLHEPTANE			.304	.248	.050	.150
2,5-DIMETHYLHEPTANE	.000	.003			.000	.001
ETHYLCYCLOHEXANE	.001	.006	.577	.412	.096	.252
ETHYLBENZENE	.000	.002	.229	.155	.038	.094

TABLE X (concluded)

1-CIS-3-CIS-5-TMCH	.000	.002			.000	.001
---UNIDENTIFIED---			.226	.183	.037	.110
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.034	.028	.006	.017
PARA-XYLENE	.001	.003	.409	.277	.068	.168
META-XYLENE	.002	.012	1.608	1.087	.266	.662
2,3-DIMETHYLHEPTANE	.000	.001	.143	.117	.024	.071
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.001	.004	.413	.337	.068	.205
2-METHYLOCTANE	.000	.003	.442	.361	.073	.219
3-ETHYLHEPTANE	.000	.001	.086	.070	.014	.042
3-METHYLOCTANE	.000	.002	.430	.352	.071	.21
ORTHO-XYLENE	.001	.003	.596	.403	.098	.245
2,2,4-TRIMETHYLHEPTANE	.000	.001	.026	.023	.004	.014
2,2,5-TRIMETHYLHEPTANE			.031	.028	.005	.017
2,2,6-TRIMETHYLHEPTANE			.057	.052	.009	.031
2,5,5-TRIMETHYLHEPTANE			.021	.019	.003	.011
2,4,4-TRIMETHYLHEPTANE			.041	.038	.007	.023
ISOPROPYLBENZENE			.092	.070	.015	.042
N-NONANE	.001	.008	1.951	1.593	.322	.966
N-PROPYLBENZENE			.055	.042	.009	.025
1-METHYL-3-ETHYLBENZENE			.288	.220	.047	.133
1-METHYL-4-ETHYLBENZENE			.165	.127	.027	.076
1-METHYL-2-ETHYLBENZENE			.122	.094	.020	.057
1,3,5-TRIMETHYLBENZENE			.588	.450	.097	.272
1,2,4-TRIMETHYLBENZENE			.557	.426	.092	.258
1,2,3-TRIMETHYLBENZENE			.239	.183	.039	.110
N-DECANE			1.635	1.481	.269	.895
C-9 NAPTHENES			.187	.150	.031	.091
C-10 PARAFFINS +NAPHTHS.			3.027	2.723	.497	1.66
C-10 BENZENES						
UNDECANES			3.475	3.459	.571	2.090
N-UNDECANE			1.507	1.500	.248	.906
DODECANES			2.463	2.671	.405	1.614
N-DODECANE			1.136	1.233	.187	.745
TRIDECANES			2.092	2.456	.344	1.484
N-TRIDECANE			.431	.506	.071	.306
TETRADECANES			.341	.431	.056	.261
N-TETRADECANE			.085	.108	.014	.065
PENTADECANES			.100	.136	.017	.082
N-PENTADECANE			.118	.159	.019	.096
HEXADECANES AND HEAVIER	.000	.005	34.950	53.519	5.742	32.342

TABLE XI

COMPOSITION OF COMPANION GAS-LIQUID SAMPLE
AHHB = GAS SAMPLE AHHC = LIQUID SAMPLE

DST No. 5, Flow 3, 10,250-340 Feet, 2/4-5X Well

COMPONENT	GAS PHASE		LIQUID PHASE		COMPOSITE STREAM	
	MOL %	WT. %	MOL %	WT. %	MOL %	WT. %
HELIUM						
NITROGEN	.401	.560			.330	.210
CARBON DIOXIDE	2.102	4.610			1.731	1.728
HYDROGEN SULFIDE						
METHANE	82.856	66.232			68.234	24.824
ETHANE	8.810	13.200	.129	.025	7.278	4.963
PROPANE	3.450	7.580	1.159	.327	3.046	3.046
ISOBUTANE	.511	1.480	.786	.292	.560	.738
N-BUTANE	.991	2.870	3.103	1.155	1.364	1.798
ISOPENTANE	.259	.930	2.532	1.169	.660	1.080
N-PENTANE	.289	1.040	3.691	1.705	.890	1.455
NEOHEXANE	.006	.027	.144	.079	.031	.060
CYCLOPENTANE	.009	.032	.287	.129	.058	.093
2,3-DIMETHYLBUTANE	.007	.028	.225	.124	.045	.088
2-METHYLPENTANE	.044	.191	1.572	.867	.314	.614
3-METHYLPENTANE	.025	.108	.970	.535	.192	.375
N-HEXANE	.073	.312	3.432	1.893	.665	1.300
2,2-DIMETHYLPENTANE						
METHYLCYCLOPENTANE	.020	.085	1.187	.639	.226	.4[illegible]
2,4-DIMETHYLPENTANE	.003	.016	.162	.104	.031	.0[illegible]
BENZENE	.016	.060	.852	.426	.163	.289
2,2,3-TRIMETHYLBUTANE						
CYCLOHEXANE	.017	.072	1.463	.788	.272	.519
3,3-DIMETHYLPENTANE						
2-METHYLHEXANE	.010	.050	.950	.609	.176	.400
2,3-DIMETHYLPENTANE	.004	.020	.371	.238	.069	.156
3-METHYLHEXANE	.010	.048	.989	.634	.182	.415
1,1-DIMETHYLCYCLOPENTANE						
1-CIS-3-DMCP	.002	.012	.197	.124	.037	.082
1-TRANS-3-DMCP	.002	.010	.252	.159	.046	.103
1-TRANS-2-DMCP	.003	.016	.323	.203	.060	.133
3-ETHYLPENTANE						

TABLE XI (continued)

N-HEPTANE	.022	.112	3.005	1.928	.549	1.247
2,2-DIMETHYLHEXANE			2.291	1.675	.404	1.047
1-CIS-2-DMCP	.001	.003	.110	.069	.020	.045
1,1,3-TRIME-CYCLOPENTANE						
METHYLCYCLOHEXANE	.016	.077			.013	.029
ETHYLCYCLOPENTANE						
2,5-DIMETHYLHEXANE	.001	.004	.129	.094	.023	.060
2,4-DIMETHYLHEXANE	.001	.008	.258	.188	.047	.121
2,2,3-TRIMETHYLPENTANE			.020	.015	.004	.009
1-TRANS-2-CIS-4-TMCP	.001	.004	.103	.074	.019	.048
TOLUENE	.010	.046			.008	.017
3,3-DIMETHYLHEXANE			1.877	1.373	.331	.858
1-TRANS-2-CIS-3-TMCP			.076	.055	.013	.034
2,3-DIMETHYLHEXANE	.000	.003	.183	.134	.033	.085
2-METHYL-3-ETHYLPENTANE						
2-METHYLHEPTANE			.901	.659	.159	.4
4-METHYLHEPTANE	.003	.018			.003	.007
3,4-DIMETHYLHEXANE	.001	.006	.298	.218	.054	.139
1-CIS-2-TRANS-4-TMCP						
3-ETHYLHEXANE			.054	.040	.010	.025
3-METHYLHEPTANE	.003	.015	.800	.585	.143	.371
3-METHYL-3-ETHYLPENTANE						
1-CIS-2-CIS-4-TMCP			.035	.025	.006	.015
2,2,5-TRMETHYLHEXANE			.036	.030	.006	.019
1,1-DIMETHYLCYCLOHEXANE	.003	.017			.003	.006
CIS-& TRANS-1,4-DMCH						
CIS-& TRANS-1,3-DMCH			.655	.471	.116	.294
CIS-& TRANS-1-2-DMCH						
1-ME-2-ETHYLCYCLOPENTANE	.000	.002			.000	.001
1-ME-3-ETHYLCYCLOPENTANE	.000	.001	.193	.139	.034	.087
2,2,4-TRIMETHYLHEXANE						
1-CIS-2-CIS-3-TMCP						
N-OCTANE	.005	.031	2.751	2.012	.490	1.269
2,4,4-TRIMETHYLHEXANE			.030	.025	.005	.01
2,3,3-TRIMETHYLHEXANE	.000	.000	.048	.040	.009	.0
---UNIDENTIFIED---						
2,2-DIMETHYLHEPTANE	.000	.001			.000	.000
---UNIDENTIFIED---			.115	.094	.020	.059
2,4-DIMETHYLHEPTANE	.000	.003	.217	.178	.039	.113
3,5-DIMETHYLHEPTANE			.296	.243	.052	.152
2,5-DIMETHYLHEPTANE	.001	.004			.001	.002
ETHYLCYCLOHEXANE	.001	.006	.586	.421	.104	.266
ETHYLBENZENE	.001	.003	.219	.149	.039	.094

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TABLE XI (concluded)

1-CIS-3-CIS-5-TMCH	.001	.004			.000	.001
---UNIDENTIFIED---	.000	.003	.219	.178	.039	.113
---UNIDENTIFIED---						
2-METHYL-3-ETHYLHEXANE			.024	.020	.004	.012
PARA-XYLENE	.001	.004	.386	.263	.069	.166
META-XYLENE	.002	.012	1.597	1.085	.284	.683
2,3-DIMETHYLHEPTANE	.000	.000	.115	.094	.020	.059
3,4-DIMETHYLHEPTANE						
4-METHYLOCTANE	.000	.003	.404	.332	.072	.209
2-METHYLOCTANE	.000	.002	.429	.352	.076	.221
3-ETHYLHEPTANE			.060	.050	.011	.03
3-METHYLOCTANE	.000	.002	.398	.327	.071	.2
ORTHO-XYLENE	.000	.002	.561	.382	.099	.239
2,2,4-TRIMETHYLHEPTANE	.000	.001	.011	.010	.002	.006
2,2,5-TRIMETHYLHEPTANE			.011	.010	.002	.006
2,2,6-TRIMETHYLHEPTANE			.054	.050	.010	.031
2,5,5-TRIMETHYLHEPTANE			.016	.015	.003	.009
2,4,4-TRIMETHYLHEPTANE			.044	.040	.008	.025
ISOPROPYLBENZENE			.084	.064	.015	.040
N-NONANE	.001	.008	1.992	1.635	.353	1.025
N-PROPYLBENZENE			.032	.025	.006	.015
1-METHYL-3-ETHYLBENZENE			.251	.193	.044	.121
1-METHYL-4-ETHYLBENZENE			.122	.094	.022	.059
1-METHYL-2-ETHYLBENZENE			.122	.094	.022	.059
1,3,5-TRIMETHYLBENZENE			.593	.456	.105	.285
1,2,4-TRIMETHYLBENZENE			.593	.456	.105	.285
1,2,3-TRIMETHYLBENZENE			.258	.198	.045	.124
N-DECANE			1.670	1.521	.295	.951
C-9 NAPTHENES			.190	.154	.034	.096
C-10 PARAFFINS +NAPHTHS.			2.773	2.507	.489	1.5
C-10 BENZENES						
UNDECANES			3.521	3.523	.621	2.203
N-UNDECANE			1.580	1.581	.279	.988
DODECANES			2.299	2.507	.406	1.568
N-DODECANE			1.272	1.387	.225	.867
TRIDECANES			2.301	2.715	.406	1.698
N-TRIDECANE			.861	1.016	.152	.635
TETRADECANES			1.151	1.462	.203	.914
N-TETRADECANE			.468	.595	.083	.372
PENTADECANES			.324	.441	.057	.276
N-PENTADECANE			.098	.134	.017	.084
HEXADECANES AND HEAVIER	.001	.006	33.053	50.881	5.833	31.814

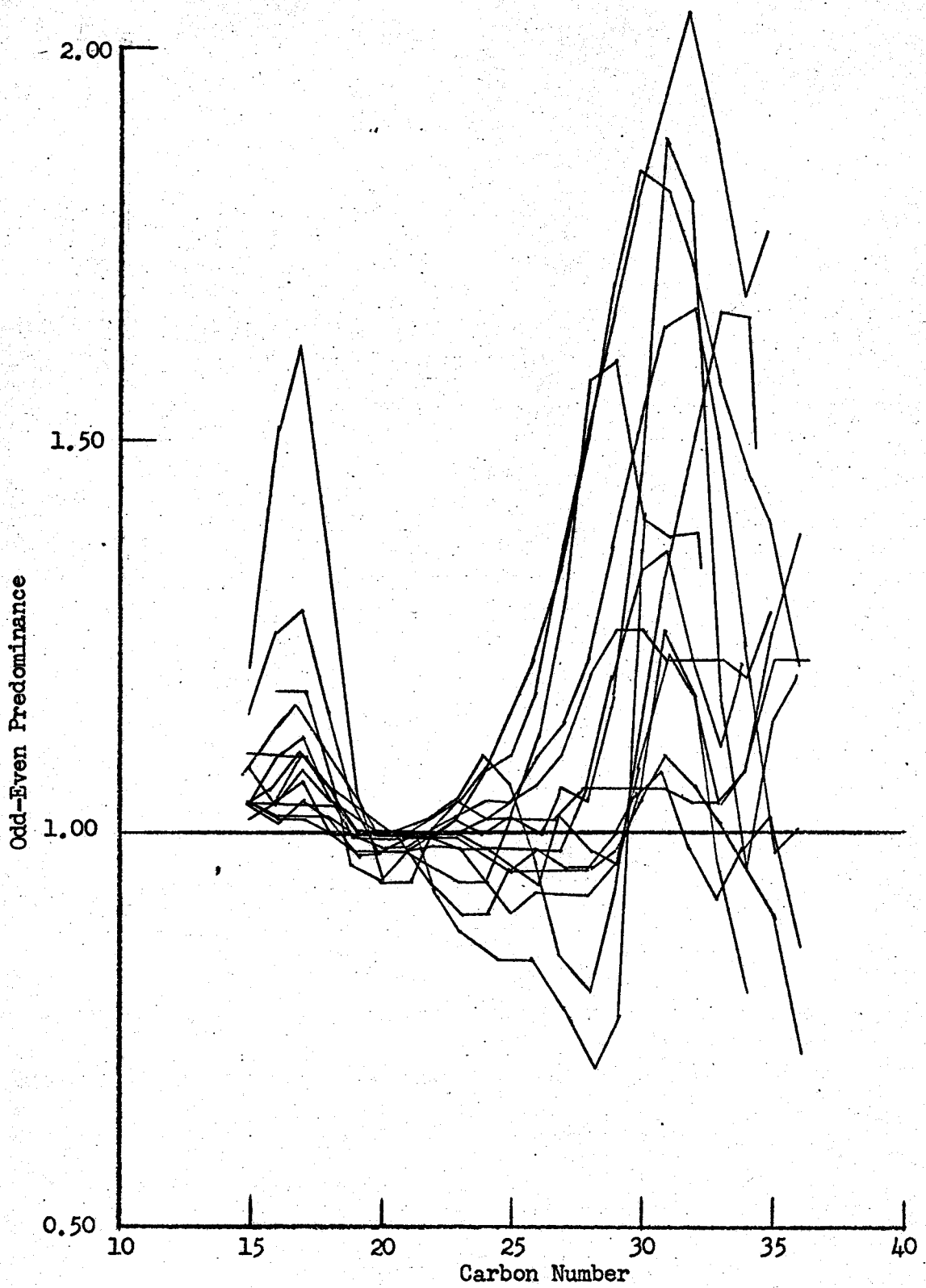

Figure 1. Odd-Even Predominance (OEP) As a Function of Carbon Number For Oil of Marine Origin in Sidewall Cores From the 9385-10093 foot Interval in the 2/4-5X Well. The Similarity in Peak Position of these OEP Curves Indicates That the Marine Organic Matter in these Shales Accumulated Under Rather Uniform Ecological Conditions.

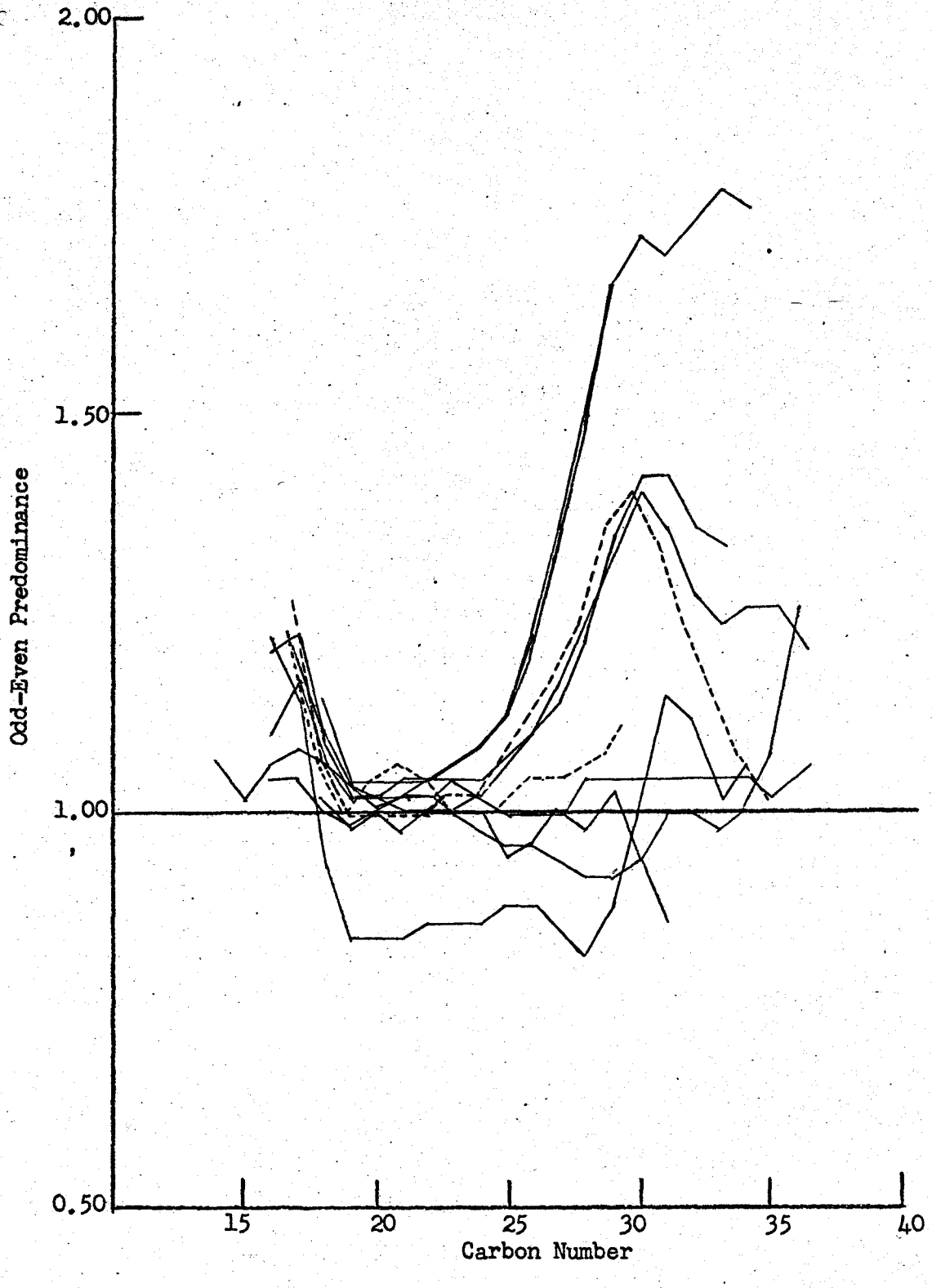

Figure 2. Odd-Even Predominance (OEP) As a Function of Carbon Number For Oil of Marine Origin In Sidewall Cores From the 30/13-1X and 2/4-4AX Wells. The OEP Curves For the 2/4-4AX Samples Are Shown By a Dotted Line and Are Taken From Figure 1, Er-103-71. The Close Similarity In Peak Positions of these OEP Curves, As Well As the Curves for the 2/4-5X Well Shown in Figure 1, Indicates That the Marine Organic Matter From These Wells Accumulated Under Rather Uniform Ecological Conditions and Is Geochemically Similar.

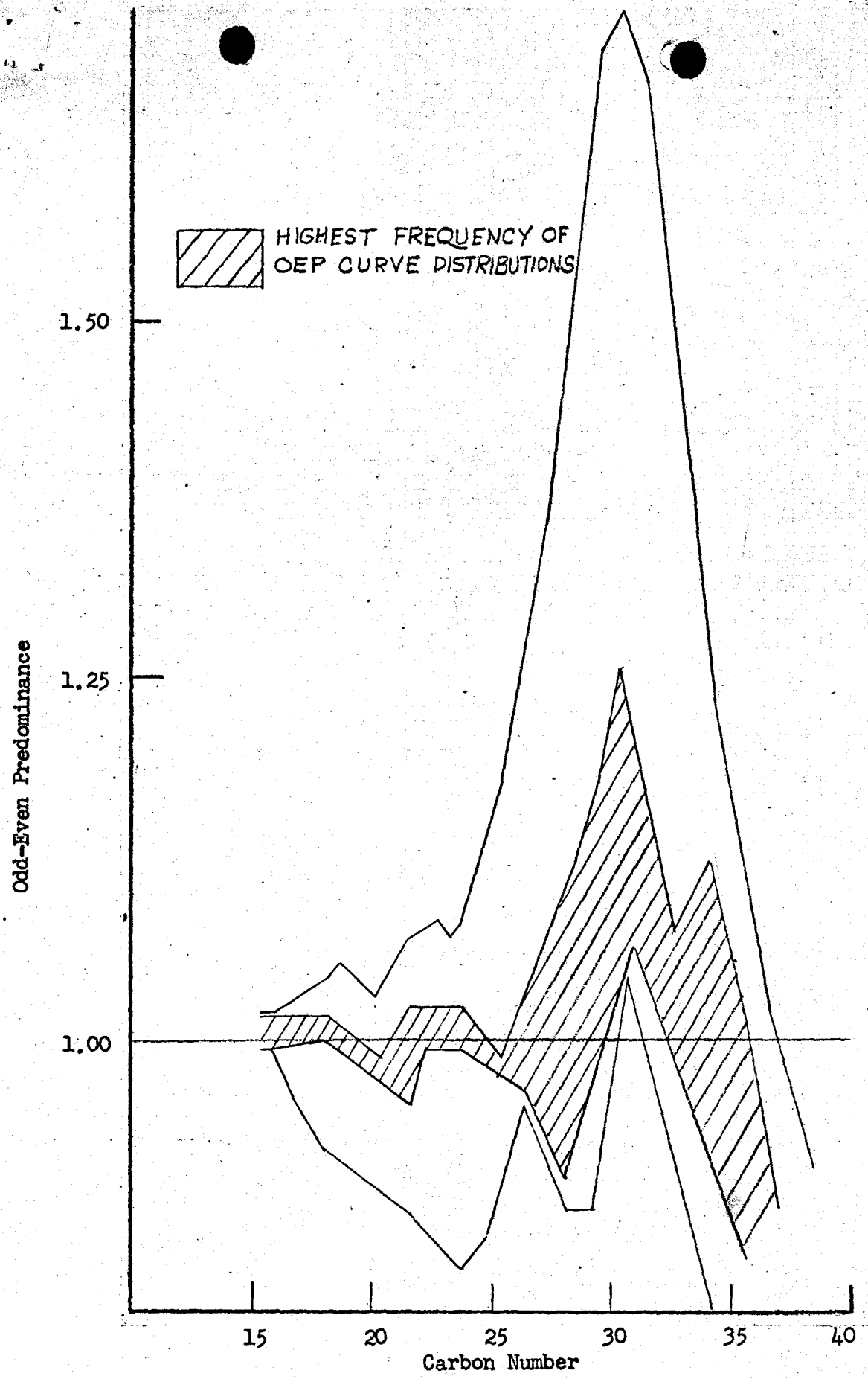

Figure 3. Representative OEP Curve Envelope for 38 Sidewall Cores From the 9450-9845 Foot Interval in the 2/4-2X Well. The OEP Curves For sidewall cores from the 2/4-4AX, 30/13-1X and 2/4-5X Wells Fit Within this Envelope Thus Indicating That the Oil in the Paleocene Section In the Josephine, Ekofisk and West Ekofisk Areas Is Geochemically Similar.

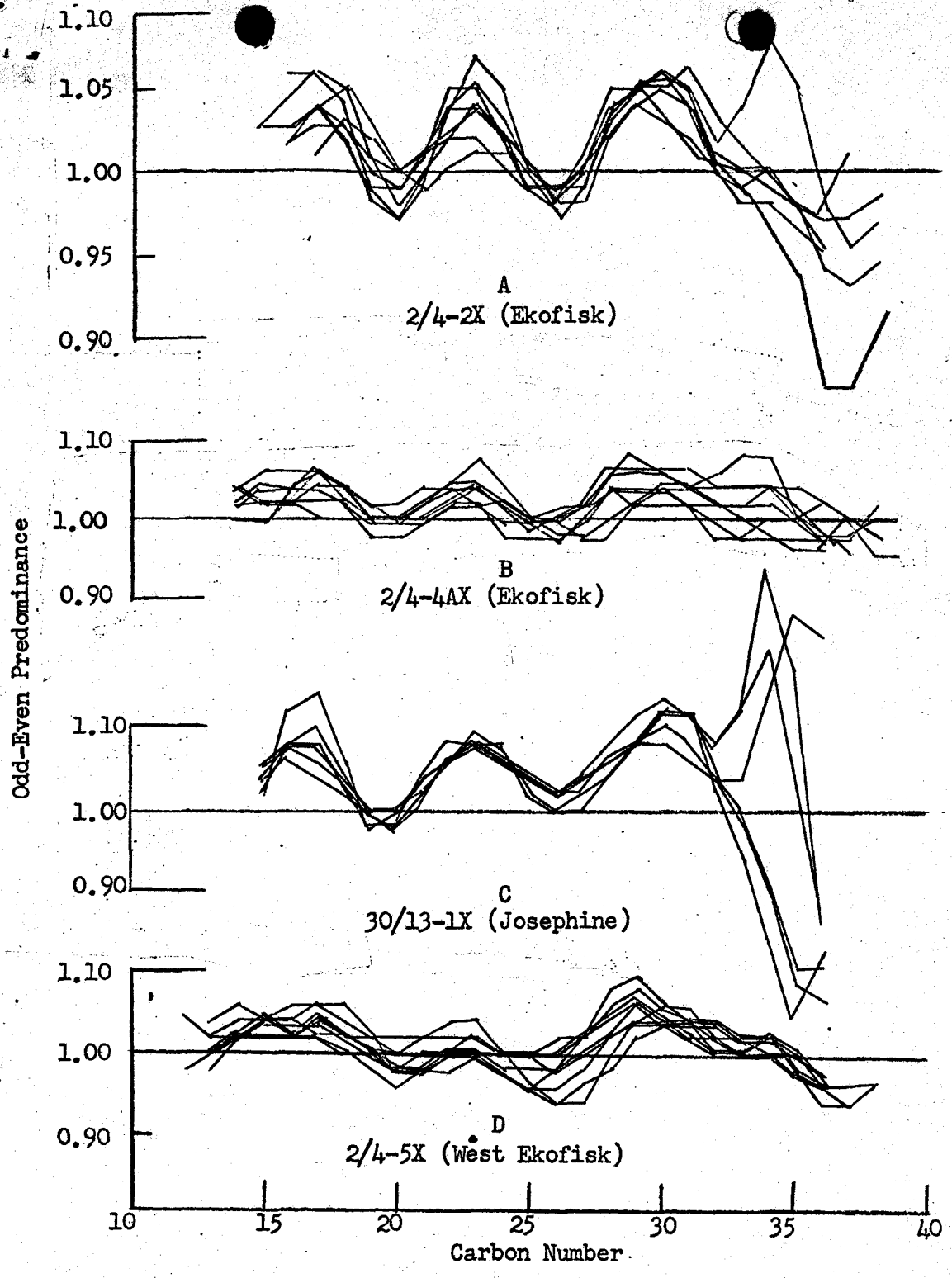

Figure 4. Odd-Even Predominance (OEP) As a Function of Carbon Number For Crude Oil Samples From the (A) 2/4-2X, (B) 2/4-4AX, (C) 30/13-1X and (D) 2/4-5X Wells. The Close Similarity in OEP Curves Indicates That These Crude Oils As Well As the Oil From the 2/4-1AX Well (Figure 5, Er-103-71) Are Similar and Apparently Originated From Source Rock Facies of Comparable Age and Deposited Under Similar Conditions.

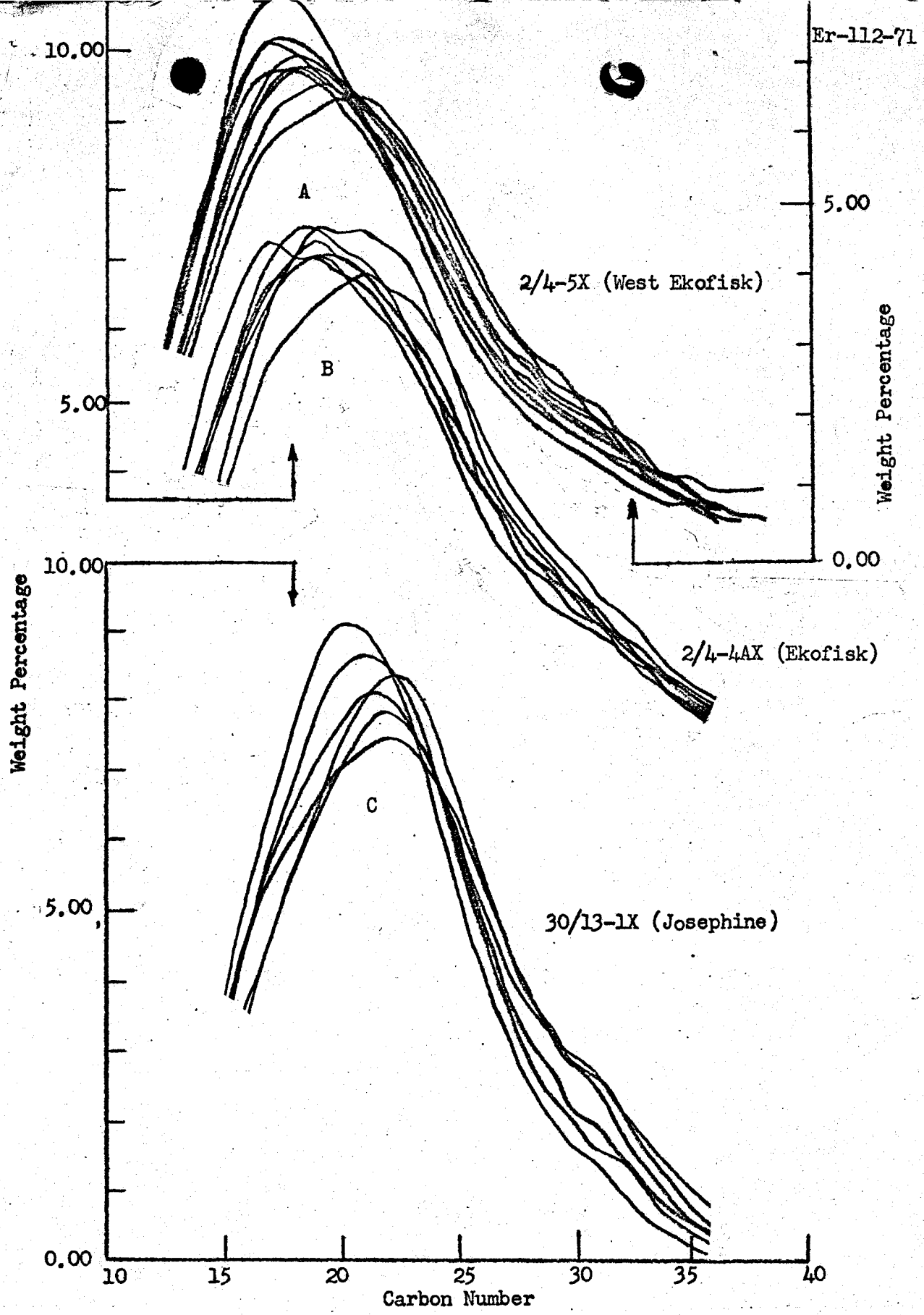

Figure 5. Distribution of n-Alkanes By Carbon Number For Crude Oils From the (A) 2/4-5X Well Compared With (B) the 2/4-4AX Well and (C) the 30/13-1X Well Indicates That These Crude Oils Are Similar Geochemically and Apparently of Common Origin. The Slight Differences Between the Two Ekofisk Wells and the Josephine Curves is Attributed To the Fact That the 2/4-4AX and 2/4-5X Samples Were Collected Under Well Head Pressure Conditions, and the 30/13-1X Samples Were Collected At Atmospheric Pressures. All Curves Are Drawn to The Same Scale, and the Arrows on the Weight Percentage Scale Indicate Which Curve They Relate To.